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Feature Article - A Comparison of the World Bank and ABS Wealth Estimates

Introduction

The World Bank recently released "Monitoring Environmental Progress (MEP): A Report on Work in Progress", describing research done in developing a framework to estimate total wealth for individual nations. The work produced a ranking of nations according to per capita wealth.

Australia's total wealth was estimated at just over $A 17,000 billion (footnote 1) in 1990, which resulted in Australia being ranked as the richest nation on earth on a per capita basis. In comparison, the ABS has recently released "National Balance Sheets for Australia - Issues and Experimental Estimates" (Cat. No. 5241.0) which valued non-financial assets at closer to $2,000 billion as at 30 June 1990, barely one-tenth of the World Bank's estimate. (In addition the ABS valued net foreign liabilities at $168.7 billion.)

This paper compares the World Bank estimates with those published by the ABS, and discusses the differences in approach and data sources. The value of land (the World Bank estimate is sixteen times the ABS estimate) is the main reason for the difference.

Definitions

The World Bank's estimates cover:

- produced assets, i.e., machinery, infrastructure etc.;
- natural capital, i.e., the economic value of land, water, timber, and subsoil assets;
- human resources, i.e., the value of the population's productive capacity.

For the purposes of compiling the non-financial assets components of national balance sheets, the ABS defines:

- non-financial produced assets as those which come into existence as the outcome of the production process, have productive lives of greater than one year and are used in the production of other goods and services, i.e., they are the result of gross capital formation;
- non-financial non-produced assets as those that come into existence through other than the process of production. They include land, subsoil assets and other natural assets (such as non-cultivated biological resources). These are sometimes referred to as "free gifts of nature".

The ABS' definitions are broadly in line with the international standard, the System of National Accounts 1993 (SNA93).

The World Bank definition for produced assets corresponds to the ABS's definition for non-financial produced assets. The World Bank's definition for natural capital, excluding water, roughly corresponds to the ABS's definition for non-financial non-produced assets.

The ABS has not attempted to measure human resources, water, or intangible non-produced assets such as patents or purchased goodwill, as it is considered there is both insufficient information and a lack of an internationally agreed framework within which to value these types of assets.

As the definitions are similar for produced and non-produced assets identified above, it is valid to compare the ABS's estimates with those of the World Bank.

The World Bank Report

The World Bank is seeking a framework for a broadly defined wealth measure, "...in part to emphasise that natural capital ought to be viewed as a factor of production." [World Bank Report, p.4]. The aim is to develop indicators of economic sustainability that can be applied to natural resources for all its 192 members. "Sustainability" is defined as the passing on to future generations at least as much wealth per capita as is currently enjoyed. The indicators aim to promote effective decision making in terms of the use of existing resources. However, the World Bank makes the following qualification:

"The wealth estimates are little more than a complex chain of educated guesses pointing the way to further research and more refined data work. ... They also serve as first approximations to be discarded once sounder calculations have been made." [World Bank Report, p. 58].

The World Bank report uses data that "..are still tentative and the results for any individual country could be a statistical anomaly due to the 'back of the envelope' methodology." [Serageldin (1995), Annex, p. 4]. There is little high quality data available. The World Bank has developed estimates with a general application, and refinements that may have been made by more statistically developed countries (such as Australia) have been ignored to keep the data comparable across national boundaries.

Two Sets of Estimates

Comparisons of the two sets of estimates are presented in Table 1. As can be seen, the difference is over $15,000 billion; the World Bank estimates are around nine times the value of the ABS estimates.

TABLE 1. ABS AND WORLD BANK ESTIMATES OF AUSTRALIA'S NATIONAL WEALTH, 1990

	World Bank(a)		ABS		Difference
Total Wealth(b)	17,071		1,811		15,260
Comparison of Produced Assets and Natural Capital					
		%		%	
Produced assets	1,207	9	1,153	64	54
Natural capital	12,243	91	658	36	11,585
Total	**13,449**	**100**	**1,810**	**100**	**11,639**

(a) The World Bank estimates have been converted into Australian dollars using a conversion rate of A$1.27 to US$1.00 at 30 June 1990.
(b) The World Bank estimate of total wealth was derived by multiplying the World Bank's estimated population (16.26 million) by per capita wealth of $1.1 million. This includes a component (valued at $3,621 billion) estimating the value of human capital. See text for discussion.
Sources: World Bank Press Release, 17 September 1995 and ABS cat. no. 5241.0.

The World Bank has included an estimate for human capital, which the ABS did not attempt to measure. This accounts for over $3,600 billion of the difference.
Of the remaining balance of nearly $12,000 billion, natural capital is responsible for 99.5 per cent.

Land

The World Bank estimates that the stock of land in Australia is worth about $8,600 billion, much higher than the ABS estimate of $533 billion. The World Bank has benchmarked land value to per capita income, which is only then split (crudely) by land use. In contrast the ABS used the approximated site value of land in Australia.(footnote 2) The ABS estimates for total land value average $100 per hectare for Australia's total land area, while the World Bank estimate equates to about $3,500 per hectare.

The ABS estimates are split into rural, residential and commercial land use. In contrast the World Bank's "short-cut" approach to land valuation only distinguishes between:

- cropland (equal to twice annual per capita income, per hectare);
- forests (one and a quarter times per capita income, per hectare);
- pastures (equal to three-quarters per capita income, per hectare);
- other (equal to one-quarter of per capita income, per hectare).

The overvaluation of land contributes significantly to the outcome of the World Bank rankings, which reflect mainly the size of a country, rather than an accurate reflection of the land value, based on its use. This is illustrated by the fact that Australia and Canada, countries with large land mass and low population densities, have the two highest per capita wealth figures.

Subsoil Assets

The World Bank values these assets at almost $1,300 billion, significantly higher than the ABS estimate of $116 billion. As similar definitions of these resources were used, the reason for the difference would appear to lie in the different valuation approaches.

The World Bank assumed that the value of the stock of subsoil assets was equal to one-half of world price for the least processed form of each particular commodity. This method has two major implications: first, the costs of extraction (including a return to produced capital), also known as economic rent, are assumed to equal half of the market price; and second, the expected future cash flow has apparently not been discounted to present value.(footnote 3)

To illustrate the ABS approach consider the following example. In 1990, black coal had a zero value in the ABS estimates because costs of extraction (including return to capital) were higher than the world price. While not all minerals had a zero rent, only a few of Australia's major subsoil assets such as bauxite, iron ore, manganese, LPG and natural gas, had a rent of 50 per cent or more of the commodity price as implied by the World Bank method.

Moreover, it would appear that the World Bank did not discount the future stream of income from these subsoil assets. As can be seen from Table 2, discounting can result in substantially different values.

Forests

The ABS values native forests at $9 billion, or less than one-half of one per cent of total wealth. This was based on an area of 22 million hectares available for harvesting.

The World Bank includes the value of forests in its estimates of natural capital, but a separate estimate is not provided. Forests are included in its estimate of 'other raw materials' which are valued at $1,300 billion, or eight per cent of total wealth. The value of these resources is benchmarked to one-half the current world price in the same manner as for subsoil assets. Accordingly, forests too will be substantially overvalued.

Difficulties with Valuing Natural Resources

The valuation of natural resources is imprecise, and is subject to particular problems. These problems include price structure, interest rates, production levels, operating costs and returns to capital, which have been assumed to remain unchanged from the time of drawing up the balance sheet to the end of the resources' life.

Any estimates of natural resource valuation are subject to several complications. These include:

- the implication that all of the resource can be extracted at once and that, if it were, it would not influence the price level of the commodity;
- the implication that problems such as spatial comparisons, aggregation and valuation problems associated with the data can be ignored;
- the need to consider the physical size of the resource in conjunction with whatever valuation approach is adopted;
- the significant volatility of the monetary estimates.

There is also the problem of choosing an appropriate rate of return to capital: an overestimation will overstate the costs of operation, and therefore underestimate the economic rent derived (or vice versa).

The choice of the appropriate rate of discount of the future stream of rent is also contentious. (footnote 4) Estimates obtained from application of the net present value approach are, therefore, highly sensitive to the choice of discount rate.(footnote 5) In order to illustrate the ramifications of choosing an inappropriate discount rate consider Table 2.

TABLE 2. ABS AND WORLD BANK ESTIMATES OF SUBSOIL ASSETS 1990 ($A BILLION)

Discount rate	ABS(a)	World Bank(b)	Difference
zero	842	1,300	458
5%	163		1,137
7.5%	116		1,184

(a) Economic demonstrated resources at year end prices.
(b) Estimated value of subsoil assets.

Table 2 shows the ABS estimates of the total value of Australia's EDR using different rates of discount compared with the World Bank's estimate. A discount rate of zero results in an estimate

of $842 billion for the ABS estimates. A discount rate of 5 per cent results in a value of Australia's EDR at $163 billion, and a rate of 7.5 per cent (the ABS's preferred rate) values Australia's EDR at $116 billion. The World Bank has valued these resources at $1,300 billion, and the size of this estimate implies that a discount rate has not been applied.

Produced Assets

The World Bank and ABS estimates of produced assets differ by less than 5 per cent. The exchange rate to convert the World Bank's estimates in US dollars to Australian dollars may account for most of the difference.

Human Capital

The ABS has not attempted to value human capital because of the difficulties associated with accurately valuing these assets (such as imputations for unpaid work and deriving a value for education). While the ABS accepts the importance of human capital for a country's economy and its productive capacity, there is no international consensus on an appropriate approach to the valuation of these resources.

The World Bank has estimated human capital as a residual, beginning from an estimate of GDP adjusted for global damage from carbon emissions and to reflect the depletion of natural resources. Produced assets and land are then deducted from the adjusted GDP to derive the residual estimate of human capital. A discount rate of 4 per cent was chosen to reflect the future income that today's population might expect, and a floor of one third the value of produced assets and land combined was also applied (because in some cases a negative, or negligible, residual resulted).

Conclusion

The main difference between the World Bank's and ABS' estimates lies in the land valuation. The ABS has taken data from detailed land valuation work that differentiate between land use and show significant differences between residential land in different states. The World Bank has arbitrarily chosen a measure, based on per capita income, to impute values for this resource.

In the ABS's view, the ABS estimates are a more accurate reflection of the value of Australia's natural resources. However, both the ABS and the World Bank estimates of wealth are experimental and are subject to further refinement.

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Footnotes

1. The conversion rate was A$1.27 to US$1.00 at 30 June 1990. < Back >

2. The ABS used data that have been collected by the Commonwealth Grants Commission, where agreed valuations were presented for each State and Territory, in order to compare the relative ability of the States and Territories to obtain revenue. For further discussion, see National Balance Sheets for Australia: Issues and Experimental Estimates - 1989 to 1992, (Cat. No. 5241.0). < Back >

3. The SNA93 recommends that, in the case of assets for which the returns are either delayed or spread over a lengthy period of time, a rate of discount should be used to calculate the net present value of expected future income stream. By discounting, it is possible to convert expected future income flows into a present value. < Back >

4. Australian Bureau of Statistics, "Valuing Australia's Natural Resources", Parts 1 and 2, Australian Economic Indicators (Cat. No. 1350.0), August and October editions 1995. < Back >

5. Nonetheless, SNA93 recommends that countries use the net present value method when calculating the value of subsoil assets (and forests) in the absence of transactions data. < Back >

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